

North County Subarea Plan



Species Distribution Model

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SPECIES DISTRIBUTION MODEL NORTH COUNTY MSCP SUBAREA PLAN

1.0 INTRODUCTION

The County of San Diego has developed a GIS-based Species-Habitat Relationships model to predict the potential distribution of all sensitive species in San Diego County. The County-wide list consists of 370 species that may be considered sensitive under the California Environmental Quality Act (CEQA) or are otherwise addressed by the Multiple Species Conservation Program (MSCP) plan. The original purpose of this model was to help define the species survey requirements for projects requiring County approval. The specific purpose of the Species Distribution Model for the North County Subarea Plan (NCSAP) is to assist in the calculation of the number of predicted species as a subcomponent of the Habitat Value Index (HVI) in the Habitat Evaluation Model (see description of the HEM).

2.0 MODEL INPUT FACTORS

The Species Distribution Model is a raster-based GIS model with 100 x 100 ft cells. The model uses six factors to assess whether the species would be predicted to occur within each cell. The factors included habitat type (i.e., vegetation communities such as coastal sage scrub, riparian scrub, etc.), ecoregion (contiguous areas of similar biogeographic conditions), elevation, topography, soil parent material, and soil structure. The County, with input from local biologists familiar with the species, identified the fundamental biological and physical factors that would best predict the presence of each species. For each cell, when the conditions for all the factors identified for a given species are met then that cell is included in the model output for that species. A County-wide map displaying all the cells where all conditions were met for a species can be considered a predicted species distribution within the County.

2.1 Habitat Types

Habitat types are generally the most important factor in describing a species potential distribution due in part to the high correlation of many of the other factors with vegetation type. Many species are closely correlated to one or a few habitat types. Habitat mapping is based on the County of San Diego Regional Vegetation Database. The regional vegetation database was created in conjunction with local habitat conservation planning programs (MSCP, MHCP) and County efforts. The vegetation mapping is based on the Holland classification. For this model, the habitat types were aggregated into the following categories:

- Coastal Sage Scrub
- Mixed Chaparral
- Grassland
- Riparian
- Oak Woodland
- Chamise Chaparral
- Mixed Conifer
- Closed Cone Forest
- Pinon-Juniper
- Freshwater Marsh
- Desert Scrub
- Desert Wash
- Salt or Alkali Marsh
- Vernal Pools
- Montane Meadow
- Coastal or Desert Dune
- Lakes and Bays

A map of the Habitat Types Factor is included as Figure 1.

2.2 Ecoregions

San Diego County is divided into 14 ecoregions or contiguous areas where similar physical geography (geology, topography, and climate) creates a similar biological environment in terms of vegetation type and species composition. The ecoregions for the NCSAP are shown in Figure 2.

2.3 Elevation

Some species have known elevational distribution limits. This factor was used for species where this information was known. A map of the Elevation Factor is included as Figure 3.

2.4 Topography

Some species have known topographical preferences. This factor was used for species where this information was known. A map of the Topography Factor is included as Figure 4.

2.5 Soil Parent Materials

Some species, including many narrow endemic plants, have a close affinity with a particular soil parent material. Figure 5 is a map of the Soil Parent Materials Factor.

2.6 Soil Texture

Many species, including fossorial animals, have a close affinity with a particular soil texture. Figure 6 is a map depicting the Soil Texture Factor.

3.0 **MATRIX OF SPECIES DISTRIBUTION FACTORS**

The species distribution model factors were put into a matrix with the factors across the top and species (listed within major taxa alphabetically by scientific name) down the left side. A copy of the complete matrix is included in Appendix A.

3.1 How Factors are Combined (Intersection Model)

The model works by looking at the intersection of all factors selected for a given species. In other words, the model output for species “X” only displays areas where all criteria for all factors were met. If a factor has all or none of the categories selected, then it does not contribute information to the prediction and is not a factor in explaining the distribution of a species. For example, if a species is known to occur at all elevations within the County then all elevation categories will be selected but the elevation factor does not contribute to the predicted distribution. Similarly, if soil parent material is irrelevant to a species occurrence, then none of the parent material categories will be selected and the factor is ignored by the model.

3.2 How Factors Were Identified

The species distribution matrix was originally specified by County staff, with Tom Oberbauer as the lead biologist. Initial parameterization of the factors was based on literature review and personal knowledge. The list of references used in this research is included in Appendix B. The matrix was sent out for review and input from local biologist and members of the project team.